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LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interest of Lake Carriers, and improve the character of the service rendered to the public.

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SHIPBUILDING FOR THE FISCAL YEAR.

The forthcoming annual report of Mr. Chamberlain, commissioner of navigation, will show that the last fiscal year was a very poor one for iron and steel shipbuilding interests on the lakes, as compared with the fiscal year 1893, but the tonnage built in the United States was almost identical in 1884 and 1892. In 1893 the tonnage built was 94,294, of which two-thirds, 62,825, was built on the lakes. In the year ending June 30 last the total was 51,470, and not much more than one-third of this 19,949, was built on the lakes. Marquette, Mich., which reported 17,398 tons as being registered from that port in 1893, reports nothing in 1894; Cleveland drops from 16,042 to 4,389; Port Huron from 9,050 to 3,401; Chicago from 8,867 to 3,092, and Detroit from 8,127 to 6,780. On the coast the tonnage built in 1894 was almost exactly the same as that in 1893, the figures being respectively 31,417 and 31,469. In the two years Newport News and Philadelphia changed places. Newport News, Va., reported 13,983 tons in 1893 and 4,665 in 1894, and Philadelphia, Pa., reported 5,527 in 1893 and 13,748 in 1894. Bath, Me., reported nothing in 1893 and nearly 6,000 tons in 1894, while Wilmington, Del., dropped from nearly 5,000 to less than 800; Baltimore, Md., shows little change, and San Francisco, Cal., built one steamer of 3,528 tons in 1893 and one of 103 tons in 1894. The fluctuations in the amount of tonnage built is shown in the following statement by years:

Year.	Tons.	Year.	Tons.
1885	44,028	1890	80,378
1886	14,908	1891	105,618
1877	34,354	1892	51,374
1888	36,719	1893	94,532
1889	54,542	1894	51,470

The increasing size of vessels is shown by the fact that while there was only 96 tons difference between the construction of 1892 and that of 1894, 55 vessels were constructed in the former year and only 39 in the latter. Among the constructions of 1894 may be mentioned a steel sailing ship of 3,004 tons in Bath, and another of 1,644 in Philadelphia; a steel steamer of 4,665 tons at Newport News, one of 3,401 at Port Huron, one of 3,092 at Chicago, one of 2,975 at Bath, one of 2,237 at Buffalo, and three of 6,780 tons in the aggregate at Detroit. Of course the St. Louis, launched at Philadelphia last week, does not appear in this enumeration, nor are wooden vessels included in these figures.

DEEPENING OF THE ERIE CANAL.

The state engineer and surveyor has begun the preliminary service on the proposed plan for the deepening of the Erie Canal to a uniform depth of nine feet. The last legislature appropriated $100,000 as a starter for this work, and State Engineer Adams intends to have it begun on the eastern end of the canal at Albany, early in the spring. The superintendent of public works will do the work according to the state engineer's plans, which will provide for deepening the canal channel a foot and raising the banks another 12 inches, changing the grades of some streets, raising bridges, etc. The work will be carried west as far as the funds will permit, which will probably be about six miles to West Troy.

VESSEL TAXATION AT DETROIT.

Papers have been filed at Detroit in suits against ten transportation companies which refused to pay taxes on their property on the ground that Detroit was not their ports of hail. The city counselor further states that nineteen more suits of the same kind would be begun shortly. The total amount of taxes due from these ten companies is about $14,000, as follows:

Farwell Transportation Co., 1892, $708.25, 1893, $620.80; Parker Transportation Co., 1892, $399.02, 1893, $333.51; State Transit Co., 1892, $249.39; Roby Transportation Co., 1892, $415.64, 1893, $378.99; Buffalo & Duluth Transportation Co., 1892, $199.50, 1893, $151.60; Wallace & Cunningham Transportation Co., 1892, $415.64, 1893, $303.19; Crescent Transportation Co., 1892, $1,862.08, 1893, $1,622.09; J. Emory Owen Transportation Co., 1892, $1,446.44, 1893, $1,243.10; Pridgeon Transportation Co., 1893, $227.39; Northwestern Transportateon Co., 1892, $1,712.45, 1893, $1,667.57.

One of the transportation companies involved applied to the supreme court two years ago for a mandamus to compel the board of assessors to strike its name from the assessment roll for the reason that it was located in Hamtramck. The mandamus was denied, the court holding that a company could not set up its hailing port in Hamtramck because it holds its annual meeting there when the actual business of the company was transacted in the Detroit office. The hailing port of a company, the court held, is in the place where the business office is located, and where its principal business is done.

The Crescent Transportation Co. was assessed $1,862.08 two years ago, and at the same time it was assessed one-fourth or one-third that amount by the village of Highland Park, in which it claimed residence. The company filed a bill in the Wayne Circuit Court asking for an injunction to restrain the receiver of taxes and the city of Detroit from collecting the tax levied on its property. A preliminary injunction was granted, but on the hearing of the motion to dissolve the same, the court ordered the dissolution of the temporary injunction.

COMPOUND AND TRIPLE EXPANSION ENGINES.

A firm of Liverpool engineers, David Rollo & Sons, draw attention to a comparison of the performance of a steamer after tripling her engines, as against her best work with the original compound engines. The particulars are as follows: Voyage with tripled engines.—Total distance steamed on round voyage, 19,103 knots; actual steaming time, 60 days, 17 hours, 25 minutes; total coal consumed, 3,661 tons; displacement, average in tons, 7,415. Voyage previous to tripling.—Total distance steamed, 19,173 knots; actual steaming time, 67 days, 5 hours, 52 minutes; total coal consumed, 4,271 tons; displacement, average in tons, 7,334. There was thus a net reduction in steaming time of 6 days, 12 hours, 27 minutes. This is equal to an increased speed of 1 1-5 knots per hour, and yet giving a reduction in coal consumed of 610 tons. The condition as to season, weather, and draught were nearly the same on each voyage.

A SMUGGLER'S DEVICE.

Several years ago, says a United States inspector of customs, I ran across some rather unique devices arranged for the purpose of getting contraband goods into this country duty free. One day I apprehended a woman who had just arrived on a steamer from Europe, suspecting that she had some smuggled tobacco in her possession. Upon examining her dress 17 pounds of tobacco were found concealed under it, but the most remarkable of the expedients she had resorted to for the purpose of deceiving the custom house officers was that of giving to the contraband leaf the resemblance of a loaf of bread. A quantity of cut tobacco had been placed into a tin, over which a thin layer of dough was spread, and this being baked had the appearance of a veritable and edible loaf. The quantity of tobacco which the woman had contrived to secrete in this and other modes amounted to over 70 pounds.

NEWS AROUND THE LAKES.

CLEVELAND. O.

Special Correspondence to The Marine Record.

The steamer Joliet docked this week in the Ship Owners' dry dock for repairs to her bottom.

The Corona, Corsica, and Cambria have arrived from Fairport and Erie, to go into winter quarters here.

The schooner Brunette has been ordered into winter quarters at Milwaukee. She will be dry docked and repaired there.

The secretary of the treasury Wednesday appointed William A. Burke third assistant keeper of the light station at Spectacle Reef, Michigan.

The many friends of Capt. W. C. Richardson, of the firm of H. J. Webb & Co., will be sorry to learn of his great loss in the death of his wife, which occurred at Madison, O., this week.

C. F. Palmer, of Buffalo, son of Capt. J. H. Palmer, and part owner in the steamer W. L. Wetmore, has gone to Milwaukee to look after the steamer, her repairs and the insurance work on her,

The Cleveland Ship Building Co., are ironing the steamer Harrow, which will remain in commission between this port and Rond Eau, Canada, until Christmas, unless the lake should freeze up. In any case Mr. Edson will keep communication open as late as possible.

Capt. E. T. Rattray, master of the steamer Specular, of the Republic Iron Co., has laid up his vessel at this port after a most successful season. Although freights as a rule have ranged low, Capt. Rattray has had what may be termed a more than good season, inasmuch as no casualties have occurred to the vessel under his control. This is due in a great measure to the well-known carefulness of Capt. Rattray, and furthermore to his technical ability as a careful and educated navigator as well as to his aptitude for business matters.

Mr. Seymour Bower, of the United States Commission, who has twice made a personal inspection of the principal fisheries on the lake, vigoronsly condemns the gill net fishing in the summer, which he says is responsible for the adsolute waste of hundreds of tons of white fish. As the nets are not raised more than once in two to four days millions of fish die and are not saleable. Mr. Bower thinks there should be a closed season in summer to prevent the catch of immature fish and the number and length of nets should be regulated. The gill net tugs from Cleveland, he says, fish all summer. If Mr. Bower is not correct in his premises should like to know it.

The funeral of the wife of Capt. W. C. Richardson, was held at the residence of her daughter, Mrs. T. H. Payne, in Ashtabula, O., on Sunday. Among those who were in attendance from Cleveland were: Harvey D. Goulder, Esq., Mr. and Mrs. M. A. Bradley, Mr. and Mrs. H. J. Webb, Mr. and Mrs. W. A. Collier, Mrs. Thomas Jones, George W. Fosmore, J. D. Simon, George Hawstreet, J. A. McGraw, L, Hansheer, jr., B. W. Holliday, James C. Wallace, J. T. Frawley, Frank Wright, Mark H. Hanlon, C. J. Jackson, John Thompson, J. C. Barnhisel, David Barnisel, Miss Hawstreet, Miss Simons, Mrs. Charles Swartwood, Miss La Marche and Miss Wisebarth. All marine people at this port are as one in offering to Capt. Richardson their condolences and their sympathy in his great loss.

DETROIT, MICH.

Special Correspondence to The Marine Record.

The schooner H. C. Richards has been ordered into winter quarters at Milwaukee.

The Nipigon, Melbourne and Wayne, of the Whitney fleet, have been laid up for the winter.

The steamer Seattle, which went ashore at Rond Eau, a few weeks ago, has been towed here by the tug Excelsior. When she arrived at this port her main deck was under water. Extensive repairs are needed which will be done by the Detroit Dry Dock Co.

Invitations have been sent to all general insurance agents for a meeting at this port Monday, November 26, to consider plans for the inspection of vessels before loading grain for winter storage. The purpose is to have vessels duly inspected on behalf of the underwriters before putting grain aboard in order to prevent losses from damaged grain.

The schooner Troy, which ran agrouud at St. Clair Flats last week, will be left there until spring, her owners considering her in very good winter quarters. Alger, Smith & Co's towing steamers Volunteer, Gettysburgh and Torrent have all been laid up at Toledo. It is now reported that the Gettysburgh will be cut down into a lumber barge at Craig's shipyard during the winter, although she is yet too good a boat for a lumber hooker.

Capt. Davis, of the revenue cutter Andrew Johnson, will probably recommend to the light-house board that a buoy be placed upon the reef off the south point of Milwaukee Bay where the Oades and San Diego stranded last week, and the Baltic brought up some time ago. While assisting in the release of the Oades and her consort, Capt. Davis made some observations which enabled him to locate exactly the dangerous character of the reef. The steamer and schooner landed upon the rocks fully three-quarters of a mile from shore. They were inside of the extreme limit of the reef, however, which is said to be upwards of a quarter of a mile farther out. Vessels of light draft, however, can pass between the beach and the reef.

A lawsuit with the Wheeling & Lake Erie Railroad Co., is one of the probabilities growing out of the sinking of the schooner M. P. Barkalow, at Toledo, last Saturday. Capt. Talbot, her owner, who resides at this port, will confer with his attorneys regarding the feasibility of bringing suit. The accident was caused by the tenders closing the bridge when the Barkalow was approaching to let a train pass over. Capt. Talbot asserts that there was not time for the schooner to get through, but the bridge tenders say there was plenty of time for her to clear the pier, and claim that the wheelman brought the schooner around too soon. Capt. Talbot's claim is, however, palpable and he will, or ought to secure all damages.

Looking at the naming of lake ports, it would be well if the nomenclature of the future was more in consonance with modern terms. A local paper has just pointed out that there is a duplication of the names of points on the lakes which, while it may not lead astray the veteran pilot who is familiar with every rock and shoal, is very confusing to the majority of people. There is a Grosse Pointe at the entrance to the Detroit River and a Grosse Pointe on Lake Michigan near Chicago. The lights at the two points bear different names, however, that of the first named being Windmill Point. On the South shore of Lake Superior there are two points bearing the name Grand Marais. There is a Presque Isle on Lake Superior and another on Lake Huron. In the straits of Mackinaw there lies a large island called Bois Blanc, while in Detroit River the name is applied to a diminutive island, more familiar because it is passed by nearly all of the lake commerce. The list might be still further continued, but I forbear.

DULUTH, MINN.

Special Correspondence to The Marine Record.

As the season of navigation nears its close freights have been inclined to ease off, and charters for fully 500,000 bushels of wheat have been made at 2⅝ cents per bushel for late shipment, a decline of ⅛ cents from the rate that has been in force for some weeks. Although vessels are desirous of holding the rate to what it ought to be, about 3 cents or 3½ cents. The week's shipment have been about 800,000 bushels. Little or no new business will be contracted from this on, practically all stuff to be loaded out having been contracted. Ore aggregating 30,000 or 40,000 tons yet remains to go forward. Most of this is to be moved by boats having season contracts, for there is practically no demand for tonnage to carry ore. During the week one boat was put in to carry ore from Ashland at 90 cents per ton. No charters have been reported at less than $1 here, and the inclination is for owners to hold off for at least $1.25 per ton. The ore shipments for the week aggregated about 30,000 tons. Frost is causing some trouble, but the stuff is generally held in cars till boats are ready to receive it, thus avoiding the possibility of its freezing in large masses in the dock pockets. Rates on lumber are firm at $2.50 per 1,000 feet for Lake Erie ports, with no new business being contracted. The week's shipments have been about 5,000,000 feet. On west bound freights soft coal pays 35 cents per ton. The lake and rail rate on package freight remains steady and unchanged on the basis of 17½ cents per 100 pounds to New York.

BUFFALO, N. Y.

Special Correspondence to The Marine Record.

Deputy Marshal Aldrich, of this port, libeled the schooner John Wesley at the Breakwater on a claim of $250 this week preferred by Rosa Boaerski, presumably the cook of the boat. The captain settled the libel at once.

Smith, Davis & Co. have $50,000 insurance placed on the steamer Monteagle which stranded on Morgan's Reef last Tuesday. The same firm have $2,800 on the Wetmore and $5,000 on the John Shaw. Worthington & Sill also also have a line of $5,000 on the Shaw, so far as I have been able to learn.

The Lehigh Valley liner Tuscarora discharged 2,500 tons of package freight and loaded 2,000 more in less than 11 working hours yesterday. She came up to her dock at 9 a. m. and was unloaded at 3:15 p. m. Before 11 p. m. she was loaded again. The dock work was done by W. J. Conners and the house work by Grattan & Latimer. This is held to be the fastest work ever done in the package freight business.

When passing down Lake Erie on Wednesday, the tow line of the schooner Bay City parted and she began rolling in the trough of the sea. She lost about 4,000 railroad ties from her deckload, and Capt. H. E. Bouty was swept overboard. He caught a line and was hauled back on deck. The tug Sumner afterwards picked the schooner up and took her under Long Point. The entire tow with the steamer arrived here all well on Saturday.

CHICAGO, ILL.

Special Correspondence to The Marine Record.

Palmer, Cook & Calbick chartered the steamer W. P. Ketcham for corn to Buffalo at 1 cent, the steamer W. H. Wolf for barley to Buffalo at 1¼ cents.

P. H. Fleming & Co. chartered the steamer H. S. Pickands for 45,000 bushels of corn and barge Marengo for 50,000 bushels of corn, both to Port Huron at 1½ cents, the steamer Normandie for wheat to Milwaukee at ¾ of a cent free.

C. W. Elphicke & Co. chartered the steamer Rhoda Emily for two loads of wheat to Milwaukee at ¾ of a cent free, the steamer Byron W. Whitaker for 80,000 bushels of barley to Buffalo at 1¼ cents, the steamer Argonaut for 80,000 bushels of oats from Milwaukee to Ogdensburg at 3½ cents, the steamer Alva for 150,000 bushels of barley South Chicago to Buffalo.

Carr & Blair chartered the steamer John F. Eddy for corn to Buffalo at 1½ cents, the steamer Maggie Duncan and consort S. O. Neff for wheat to Milwaukee at ¾ of a cent free.

During the week the schooner Herschel was in dock for re-calking bottom, the steamer A. A. Parker for repairs to shoe and some calking, the steamer Tacoma for some calking, the steamer John Oades for stopping leak and repairs.

The steamer John Oades, Capt. T. L. May, arrived here Saturday morning with coal from Buffalo, leaking. She went ashore on Friday morning at 3 a. m. on South Point, Milwaukee Bay, and was released after jettisoning a portion of her cargo, by the steamer Andy Johnson and four Milwaukee tugs, at 3 a. m. of the same day. The Santiago, one of her consorts, also went ashore and after jettisoning a portion of her cargo was released by some Milwaukee tugs. The Redwing, also a consort of the Oades, did not go ashore and sailed to Chicago.

The schooner Waukesha, Capt. Duncan Corbett, with bulk salt from Manistee to South Chicago, sprung a leak when running into Sheboygan, Wis., for shelter last week. Capt. Corbett is here waiting for favorable weather to leave for Sheboygan, on the V. O. T. Co.'s tug Calumet, with a steam pump to be placed on board the schooner to keep her free whilst being towed to South Chicago by the Calumet.

Capt. Patrick Pardee, aged 58 years, died at 1 p. m., November 13th, at his late residence, 755 West Indiana street, Chicago. He was father of Capt. G. W. Pardee, and also leaves one other son and a daughter and his mother, aged 85 years, who resides at Ogdensburg, N. Y. The deceased sailed the Lakes about 45 years and had 31 issues of masters' papers. He was widely known and much respected by his marine friends and associates. He was a member of the Shipmasters' Association and of the Grand Haven Masonic lodge, No. 139, A. F. & A. M., Corinthian Chapter No. 84, R. A. M. He was buried at Rosehill cemetery, Thursday morning,

with Masonic honors by Kilwinning lodge No. 311. Many old marine friends attended his funeral.

The wrecking tug Favorite, Capt. M. Swan arrived here Saturday morning from Cheboygan for the purpose of releasing the steamer Monteagle which went on Morgan's Reef on the 13th inst. Wrecking operations were commenced and steam pumps were put on board the steamer Saturday, and the work of lifting her off the rocks with hydraulic screws was commenced and continued until Sunday night when a heavy gale from the north caused operations to be suspended. Monday morning a signal of distress was hoisted on the Monteagle and the Jackson Park Life Saving crew went out to her and brought captain and crew ashore. Up to Tuesday night no further work was done on her as the sea was running too high for the Favorite to get near the wrecked steamer which has several holes in her bottom and lots of water in her hold. If the bad weather continues as predicted by the weather man, she will become a total wreck. Capt. Geo. McLeod is here looking after the wrecking operations on behalf of the underwriters. We entertain hopes that the Monteagle will be released.

Captains John Shaw, J. W. Dillen, A. A. Parker, James Davidson and Geo. McLeod are visiting Chicago.

J. G. Keith & Co. chartered the steamer America for corn to Buffalo at 1½ cents.

Capt. Thomas Fitzpatrick, of Cleveland, is here looking after some repairs on the steamer George T. Hope and the laying up of the Hope and her consort, John C. Fitzpatrick.

Capt. John M. Clossey, of the steamer Rochester, of the Union Line, which arrived here Thursday, was compelled to return by train to his home at Buffalo, as he was suffering from bilious fever and inflammation of his kidneys. Chief mate John W. McDonald was placed in command of the Rochester to take her to Buffalo.

Captain James Brion, of the steamer Rhoda Emily, slipped on deck and fractured one of his legs, Friday night, at Milwaukee. Capt. Robert W. Hayes went to Milwaukee, Saturday, to take charge of the steamer.

The new revenue cutter Calumet arrived here last Thursday, from Buffalo, in command of Capt. John Dennett, Chief Engineer D. C., Chester, Assistant Engineer D. F. Bowles, and Pilot Thos. R. Gleason. She has been visited by a large number of persons since her arrival.

The Parker fleet, which comprise the steamers A. A. Parker and John Oades and barges B. W. Parker, Santiago and Redwing, are being put in winter quarters here. The Mellen fleet will also go into winter quarters here. The Iron King, Iron Queen, Iron Chief and Iron Cliff are here. The Iron Age and Iron City are coming from Milwaukee, and the Iron Duke and Iron State are on their way up from Buffalo.

NOTICE TO MARINERS.

UNITED STATES OF AMERICA—NORTHERN LAKES AND RIVERS—MICHIGAN.

WINTER POINT RANGE, REAR LIGHT STATION.—Notice is hereby given that the structure from which is shown the rear light of this range, on the southerly end of Neebish Island, St. Mary's River, has been moved to a point on the Westerly prolongation of the range line, 675 feet in rear of the front light, and the light exhibited therefrom as heretofore.

By order of the light-house board.

JAMES A. GREER,
Rear-Admiral, U. S. Navy, Chairman.

Office of the light-house board, Washington, D. C., November 15, 1894.

Notice is hereby given that the iron buoys in Green Bay and Lake Michigan will be taken up between December 1st and 10th, 1894, and spar buoys painted in the same manner as the iron buoys substituted therefor. The light-vessels will be left in position until December 10, 1894, if the weather will permit.

COMMANDER J. H. DAYTON, U. S. N.,
Inspector 9th Light-House District.

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1. AIDS TO NAVIGATION IN PARRY SOUND.—Five lights established by the government of Canada to indicate the entrance to Parry Sound, on the east shore of the Georgian Bay, Ontario, were put in operation on the 29th ult. They are located as follows:

WALTON ISLAND LIGHT.—The first of these lights is located on the westernmost Walton Island, and is the front light of a pair to be known as the Snug Harbor range. Lat. N. 45° 22′ 18″. Long. W. 80° 19′ 38″. The light is a fixed red catoptric light, elevated 39 feet above the level of the bay, and should be visible 7 miles in, and over a small arc on each side of, the line of range. The tower is a square, pyramidal wooden building, surmounted by a wooden lantern. It is 29 feet high from the ground to the vane on the lantern, and is painted white, with a red stripe 3 feet wide on the side facing the channel.

SNUG HARBOUR LIGHT.—The second light is built on the south extremity of an island on the north side of the entrance to Snug Harbour, and is distant 3,100 feet E. by N. ¼ N. (69° 56′ E. true) from the first described. Lat. N. 45° 22′ 27″ Long. W. 80° 18′ 58″. The light is a fixed white catoptric light, elevated 62 feet above the level of the bay, and should be visible 13 miles in, and over a small arc on each side of, the line of range. The building is of wood, and consists of a square pyramidal tower, rising from the roof of a rectangular dwelling house, surmounted by a wooden lantern. It is 50 feet in height from the ground to the vane on the lantern, and is painted white with a red stripe 3 feet wide on the middle of the side facing the channel. The two lights in one lead in E. by N. ¼ N., south of Seguin Bank through the main channel to the intersection with the Jones Island range.

GORDON ROCK LIGHT.—The third light is on the summit of the northernmost Gordon Rock, and is the front light of a pair of leading lights to be known as the Jones Island range. Lat. N. 45° 18′ 56″. Long. W. 80° 17′ 15″. The light is a fixed red catoptric light, elevated 40 feet above the level of the bay, and should be visible 7 miles over an arc of 180 degrees between the bearings of S. E. by E. ½ E., round through S. to N.W. by W. ½ W. The tower is a square pyramidal wooden building, surmounted by a wooden lantern. It is 38 feet high from the ground to the vane on the lantern, and is painted white, with a red stripe 3 feet wide on the middle of the side facing the channel.

JONES ISLAND LIGHT.—The fourth light is located on the southwest point of Jones Island, distant 2,900 yards S. E. ¼ S. (S. 48° 11′ E. true) from Gordon Rock light. Lat. N. 45° 18′ 0″ Long. W. 80° 15′ 42″. The light is a fixed white light, elevated 63 feet above the level of the bay, and should be visible 8 miles in, and over a small arc on each side of, the line of range. The building is of wood, and consists of a square pyramidal tower, rising from the roof of a rectangular dwelling house, and surmounted by a wooden lantern. It is 50 feet in height from the ground to the vane on the lantern, and is painted white with a red stripe 3 feet wide down the middle of the side facing the channel. These two lights in one lead in S. E. ¼ S. from the intersection with the Snug Harbour range lights to Gordon Rock, clear of Ariel Rock, Hall Reef, Telegram Rock and Hooper Island Reef, on the starboard hand; and clear of Black Rock and Twin Rock, on the port hand.

HUGH ROCK LIGHT.—The fifth light is located on the summit of Hugh Rock, at the junction of Albert Channel with the main channel. Lat. N. 45° 19′ 10″. Long. W. 80° 14′ 31″. The light is fixed white, elevated 34 feet above the level of the bay, and should be visible 7 miles from all points of approach by water. The illuminating apparatus is dioptric of the 7th order. The tower is a square pyramidal wooden building, surmounted by a wooden lantern. It is painted white, with a red stripe 3 feet wide on the west side. Vessels entering Parry Sound will make the approach guided by Red Rock light as previously, until they bring the Snug Harbour range lights in one, when they will enter the main channel, keeping them in one E. by N. ¼ N. until the Jones Island range is brought into alignment. This alignment is then kept S. E. ¼ S. until within ¼ miles of Gordon Rock, when they should haul up E. by S. ¼ S., leaving Gordon Rock on the starboard hand. When on a line joining Gordon Rock and Hugh Rock they can bear up for Hugh Rock light and keep the course east until within ¾ mile of Hugh Rock light when they again change the course to N. E. by E. ¼ E., to pass Cameron Island. After passing Cameron Island the entrance to Parry Sound is free from shoals.

BUOYS.—In connection with the establishment of the channel above described, the spar buoys in the approaches to Parry Sound were changed last spring, and are now moored on or close to the channel side of the following dangers:

A black buoy at Richmond Rock.
A black buoy at McGowan Rock.
A red buoy at Three Star Shoal.
A red buoy at Ariel Rock.
A black buoy at Twin Rock.
A red buoy at Telegram Rock.
A black buoy on shoal south of Reid Island.
A red buoy on shoal northwest of Hugh Rock.
A black buoy on 2¼ fathom patch S. W. of Carling Rock.
A black buoy on extremity of reef off Bobs Point.
A red buoy on 1¾-fathom patch in the inner harbor.

The buoys shown on Admiralty Chart 1731 south of Carling Rock have been discontinued.

CHANGE OF LIGHT AT KAGAWOG.—The temporary pole light, maintained at Kagawong, at the port of Mudge Bay, North Channel, on the north shore of Manitoulin Island, District of Algoma, Ontario, has been replaced by a light shown from an enclosed tower. Lat. N. 45° 54′ 31″. Long. W. 82°, 15′, 45″. The tower is built in the same location as the original mast, 75 feet back from the shore line, and 100 feet westward from the public wharf. It is a square pyramidal wooden building, surmounted by a wooden lantern, and is 27 feet high from its base to the vane on the lantern. The tower is painted white, the lantern red. The light is a fixed white catopric light elevated 38 feet above the level of the bay. It should be visible 11 miles from all points of approach by water. It was first shown from the new tower on the 29th October, 1894.

BUOY OFF LOTTIE WOLF ROCK.—A red spar buoy was moored on the 27th August last, off Lottie Wolf Rock, off the north side of Hope Island, in the Georgian Bay. Lat. N. 44° 55′ 25″. Long. W. 80° 10′ 28″. It is moored in 22 feet of water and from it Hope Island lighthouse bears S. S. E. ¼ E., distant one nautical mile, and the shoal of 9 feet water S. by E. ½ E., distant 400 yards. Vessels approaching the buoy from the westward must not bring it to bear anything to the northward of E. ¾ N. They may pass close to the buoy, but after passing it must not head anything to the southward of the northeast point of Beckwith Island, until past Hope Island light.

☞ All bearings, unless otherwise noted, are magnetic and are given from seaward, miles are nautical miles, heights are above high water, and all depths are at mean low water.

Pilots, masters, or others interested are earnestly requested to send information of dangers, changes in aids to navigation, notice of new shoals or channels, errors in publications, or any other facts affecting the navigation of Canadian waters to the Deputy Minister of Marine and Fisheries, Ottawa, Canada.

WM. SMITH,
Deputy Master of Marine and Fisheries.

Department of Marine and Fisheries, Ottawa, Can., 12th November, 1894.

REPORTED BY THE LOOKOUT.

Dunbar & Sullivan, dredging contractors, will build an iron scow at Sault Ste. Marie this winter of the following dimensions: 162 feet long, 25 feet beam and 11 feet deep, for use in their dredging work.

The schooner Alert has been released from the beach at Grand Haven, where she had been for a week. None of the bodies of the crew of the lost schooner Antelope, which capsized off that port, have yet come ashore.

The schooner David Wallace, which was ashore near Seul Choix Point, arrived at Manitowoc, Wis., all well on Saturday, in tow of the wrecker Monarch. The steamer Robert Wallace also reached port safely with her wrecked consort, but continued to Milwaukee to unload. The damages to the schooner Manitowoc, which was carried against the piers while entering the harbor in last Monday's gale, will be $1,000.

As a record of how it can blow on the lakes in the fall, there was noted at Cleveland for a twelve hours' speed this week 30 miles southeast; Toledo, 38 miles south; Milwaukee, 34 miles southwest; Detroit, 34 miles southwest; Erie, 32 miles south; Port Huron, 34 miles south; Alpena, 38 miles southeast; Sault Ste. Marie, 30 miles south.

Two sailors, claiming that the captain of the schooner S. L. Watson owed them for a cruise on up trip, attempted to libel her at Duluth last Thursday. With a deputy marshal they entered the office of the schooner's agent and announced their intention. The agent pointed out the schooner on her way down the lake in tow of the City of Genoa, and wished them success in their undertaking. The trio started out in a tug, but after a chase of several miles saw that they could never catch the tow, and turned back disgusted.

AMERICAN SHIPMASTERS' ASSOCIATION.

The *Record of American and Foreign Shipping*, for the year 1895, will be ready for delivery to subscribers about Dec. 20th, 1894. This 27th volume of the *Record* will contain: Reports and particulars of about eighteen thousand vessels engaged in the American and Foreign trade. Rules for the Construction of Iron, Steel and Wooden Vessels. Rules for the Construction of Steam Machinery for Vessels. Rules for the Installation of Electric Lighting and Power apparatus on shipboard. Names and location in the United States of Shipbuilders, and of Constructors of Marine Machinery and Boilers for vessels, and of Dry Docks and Marine Railways, with capacity of same. A list of representatives of marine underwriters throughout the world, and other valuable information of special importance to underwriters and all firms or individuals interested in shipping. This work has the official approval of underwriters, and is universally recognized as a standard classification and register of shipping.

LAKE MICHIGAN-ERIE CANAL.

In 1829, Mr. Stanberry, United States engineer, made surveys between the lakes Michigan and Erie. The route selected was from Lake Michigan through the Kankakee swamp by way of the Tippecanoe to the Wabash River, thence by way of the Wabash and Maumee Rivers to Lake Erie. The divide between the Tippecanoe and Kankakee is 137 feet above Lake Erie, while the lowest summit between the Kankakee and Calumet is 144 feet above Lake Erie. There is no point where it would be possible to carry a canal across the country from the Wabash River to the Kankakee swamp between Fort Wayne and the mouth of the Tippecanoe River. This, perhaps, gives a sufficient explanation for the abandonment of the route of 1830.

This work was again taken up in 1833, when two lines were run from Lake Michigan, one by the Kankakee to the Wabash River at the mouth of the Tippecanoe, and the other from Michigan City by way of the Big St. Joseph and the Elkhart Rivers to Fort Wayne.

As a result of these surveys, the Indiana legislature at its session in 1836-38 authorized the construction of a ship canal from Michigan City to Fort Wayne. It is said that over $200,000 was spent upon this work in Noble county, but for some reason now unknown, the work was abandoned.

During later years some attention has been given to a route through southern Michigan, from some point on Lake Erie or the Detroit River to Lake Michigan. In this route it would be necessary to pass through one of the three southern tiers of counties in Michigan in order to avoid the watershed leading to Saginaw Bay. The highest summit which forms the watershed between Lakes Erie and Michigan starts in the northern part of Hillsdale county. The average elevation is 518 feet above Lake Erie. The average elevation in Jackson county is 441 feet above Lake Erie. It will thus be seen that the watershed of southern Michigan cannot be crossed without reaching elevations of at least 450 feet above Lake Erie, and the chances for maintaining a water supply on this height are considered very hazardous.

At this time Dr. W. T. Harris, Defiance, Ohio, proposes a ship canal between Lake Erie and Lake Michigan, leaving the former at Toledo, following up the Maumee River by slack water navigation to a point near the state line of Indiana, thence across the northern part of Allen county to a chain of lakes which cross the summit in Indiana; from the western end of these lakes down Turkey Foot creek to the Elkhart River, down this stream to Goshen, Ind., at which place it will leave the Elkhart River and follow parallel with it to the city of Elkhart, thence south of the Big St. Joseph to South Bend, from this point to Michigan City, which is 20 miles across Lake Michigan from Chicago.

The route suggested by Dr. Harris is accessible by leaving the Elkhart River at the junction of Turtle Creek and then following it to a point in Jackson township in Elkhart county, thence across and into the creek again five miles from Syracuse Lake, through it and Turkey Creek into Turkey Lake, which is nine miles long, of an average width of one and three-quarters miles, and 85 feet in depth, and then through a series of 15 small lakes extending southeast from Turkey Lake along the Tippecanoe River. These lakes vary in size from 40 to 700 acres and include Little Turkey lake, Loon Lake, Tippecanoe Lake, Crooked Lake, Cedar and Round Lakes. Syracuse, Turkey and Little Turkey Lakes have their outlet through Turkey Creek and down the big St. Joe River, while the rest of the chain finds an outlet through the Tippecanoe into the Wabash River. Between these chains of lakes is a swamp which is not elevated more than 10 feet.

The lake at Chicago is said to be 12 feet higher than the lake at Toledo. It would therefore require but little work, other than dredging, to make the Maumee River from Toledo to the foot of the rapids navigable for large vessels, and by this means and the construction of a number of dams at various points along the river between Toledo and the state line slack water navigation could be furnished for more than half of the distance between Toledo and Michigan City, by the use of which it would not be necessary to restrict the speed of boats.

The good to be derived from the construction of such a waterway would be the further development and improvement of the territory immediately along the line of such a canal by giving it better facilities for navigation, drainage and water power. Other and greater reasons for the construction of such a waterway would be the shortening of the distance between Lake Erie and the southern end of Lake Michigan to 204 miles, whereas it is now 820 miles (a difference of 616 miles), giving the government a waterway between Lake Michigan and Lake Erie wholly within the territory of the United States, and the lengthening of the season of navigation. The money now invested in vessels, docks and other facilities for lake navigation which would be brought into use longer during the year than they are at the present time, is computed to be at least five times the amount necessary for the construction of such a waterway.

AMPLITUDES.

The following approximate amplitudes of the Sun's rising will be given each week in this column during the season of navigation: A second bearing of the Sun may be taken at sunset by reversing the bearings to read west instead of east, as, for example, E. S. E. for a sunrise bearing would read W. S. W. for a sunset, or E. 35° S. to W. 35° S.

LAKE ERIE AND S. END LAKE MICHIGAN LAT. 42° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Nov. 26	E. 29° S.	S. E. by E. ⅜ E.
Dec. 2	E. 30° S.	S. E. by E. ¼ E.

LAKE ONTARIO, S. END HURON AND CENTER LAKE MICHIGAN LAT. 44° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Nov. 26	E. 30° S.	S. E. by E. ⅜ E.
Dec. 2	E. 31° S.	S. E. by E. ¼ E.

N. END LAKES HURON AND MICHIGAN, LAT. 46° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Nov. 26	E. 31° S.	S. E. by E. ¼ E.
Dec. 2	E. 33° S.	S. E. by E. ⅛ E.

LAKE SUPERIOR LAT. 48° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Nov. 26	E. 32° S.	S. E. by E. ⅛ E.
Dec. 2	E. 34° S.	S. E. by E.

With a compass correct magnetic, the difference between the observed and true bearings will be the variation for the locality. If there is any deviation on the course the vessel is heading at the time of taking the bearing the result after the variation is applied will be the amount of deviation on that course.

SINGING SAND.

One of the most curious and unaccountable of the natural phenomena is that of "singing," "barking" or "musical" sand. The emission of queer noises from the sand of the seashore has been known for ages, but the first scientific investigation in that line in America was made by the coast survey corps within the last ten years, when it was found that singing sand could be found in twenty-six different places along the Atlantic, Pacific and Gulf coasts. One of the most remarkable as well as the largest and best known banks of singing sand in the United States is on the beach at Manchester, Mass., where for a distance of about one-fifth of a mile, the sand gives forth a distinct sound when walked upon or even if stirred with a cane or the finger. Prof. Julien, of Columbus college, who has given the subject of sonorous sands much study, says: "Singing sands may occur in comparatively small patches in the midst of the ordinary seashore sand, but always between the limit of high and low tide. The same sand does not produce sounds at all seasons, nor are the sounds uniformly the same day by day. Another peculiarity is this: It will not give forth sounds when wet. * * * The theory concerning singing sands is this: The sound is produced by friction between the angular particles, and the conditions necessary, perfect dryness and uniformity in size of grain as well as perfect freedom from dust."

Prof. C. H. Bolton, of Trinity College, Hartford, Ct., who made a trip to the Sandwich Islands in the summer of 1890 for the sole purpose of examining the sonorous sands of that country, says: "The sonorous properties of singing sand are due to pellicles or films of air or gas deposited or condensed upon the surfaces of the sand grains during gradual evaporation. By virtue of these films the sand grains become separated by elastic cushions of condensed gases, capable of considerable vibration. The extent of these vibrations and the volume and pitch of the sound also depend much on the size and shape of the sand grains."

A NAUTICAL COLLEGE.

Capt. Howard Patterson, founder of the New York Navigation School, formerly professor of naval science at Brown's College, commandant of the Haitien navy and author of "The Navigation Pocket Book," "The Illustrated Nautical Dictionary," "Hand Book for Masters and Mates," "Yachting Under American Statute," etc., has re-opened his nautical college in New York, at 130 Water street.

The college studies are aptly divided into three courses. The first embraces the rudiments of navigation, the second course is very complete and exhaustive, going into all the practical workings of general navigation, the third course coming under the head of "post graduate grade, equips the student with all that remains to be taught in relation to the art of practical navigation, including the study of great circle sailing, circum-polar navigation, nautical astronomy, longitude by the moon, planets and stars, law of storms, rating a chronometer, etc.

The re-establishment of this nautical college for merchant seamen in New York, is of prime importance to the vessel owner, underwriters' the sailing fraternity and the general commercial interests of the country. With so eminent and experienced a principal as Capt. Patterson in charge, this institution should meet with encouragement from the state and we would suggest that a certain sum per capita be allowed the nautical college from municipal or state funds for each student given technical training in the institution.

A positive necessity in the upbuilding of an American merchant marine is that the educational standard of the officers should be raised from year to year, instead of dragging along in the same old rut of a quarter of a century ago. Officers on deck and in the engine room ought to be required to show a wider appreciation of their business than has heretofore obtained, and the opening of the New York nautical college is a step forward in this direction, but unless or until the board of supervising inspectors of steamboats call for extra qualifications before granting certificates of competency to candidates, the work of this college and similar institutions in other parts of the country must, in a great measure, be held back, if not partly nullified, as the candidate will seldom or never seek to rise superior to the intelligence of the examining officer in whose hands rests the power to grant or refuse a license after the voluntary examination has been gone through according to the form and dictates of the board and its subordinate officials.

However, whether the men who have power to make or mar the officers of the United States mercantile marine advance to the modern requirements of the age or not, the opening of nautical schools of instruction are to be heartily welcomed and we hope that the institution presided over by Capt. Howard Patterson is but the precursor of many others that will spring up from Maine to California and thus through private enterprise elevate the standard of ship's officers to that level which the government department has so far denied, by not requiring them to attain the skilled efficiency made absolute by other maritime countries.

LEATHER BELTS.

No one using leather belts can afford to be indifferent to their care. There is a certain amount of elasticity in all good leather belting, but time and continued hard work seem to destroy or at least weaken its power. Then comes the question whether it is better to simply tighten the belt or use some form of dressing. Experience of many very practical observers seems to favor the use of a good dressing, as tightening the belt strains it and calls for more engine power. A dynamo engineer who is transmitting 60-65 H. P. with a 50-foot link belt 8 inches wide, running from a 72-inch pulley on driving shaft to a 13-inch pulley on dynamo, claims that freedom from jumping and flickering of the lights is due entirely to the belt dressing used and that tightening never helped. The superintendent of a large printing establishment has an 18-inch main belt now running its eighth year which has never been taken up, and it would be extremely hard to convince him that the dressing used does not preserve the life of the leather and keep it soft and elastic. Of course one should be careful what sort of dressing is used. Soap, rosin, tar and tallow should not be used at all. Even castor oil is criticised. The dressing used in the two cases cited was Dixon's belt dressing and leather preservative, which was the only article that would start the big driving belt used at the Paris Exposition in 1878, and keep it from slipping. Circulars about the dressing will be sent to any one interested by the Dixon Crucible Co., Jersey City, N. J.

MARITIME LAW.

TEXAS & P. RY. CO. v. NOLAN.

Circuit Court of Appeals, Fifth Circuit. May 15, 1894.

1. NEGLIGENCE—AVOIDING CONSEQUENCES OF CONTRIBUTORY NEGLIGENCE.—The rule that plaintiff cannot recover if himself guilty of negligence contributing to his injury, though not applicable where defendant, by the exercise of reasonable care, might have avoided the consequence of plaintiff's negligence, applies, without qualification, where the party inflicting the injury is not chargeable with negligence indulged after the position of the injured party was discovered, or, by the exercise then of reasonable care, would have been discovered.

THE FELIX.

District Court, E. D. Pennsylvania. July 20, 1894.

1. SALVAGE COMPENSATION—EXPENSES.—A salvage undertaking is a speculative venture in which there is no reward if nothing is saved to the owner; and hence, if a claimant appears, the salvors are not entitled to the entire proceeds, even if they have necessarily incurred expenses exceeding the same.

2. SAME.—A steel vessel moored alongside a vessel laden with oil was withdrawn from a burning wharf by tugs, but sank immediately afterwards. The tug owners then claimed a right, by virtue of their salvage services, to raise the vessel, which they did at an alleged expense of $20,000, besides their services. The vessel sold under order of court for only $10,560. Held, that the salvors should receive but two-thirds of the proceeds, although this fell short of their expenses necessarily incurred.

PARROTT v. NEW ORLEANS & N. E. R CO.

Circuit Court, E. D. Louisiana. June 27, 1894.

1. MASTER AND SERVANT—CONTRIBUTORY NEGLIGENCE OF SERVANT—PLEADING.—The petition in an action against a railroad company for injuries to a foreman of a switching crew while uncoupling cars, resulting from a defect in defendant's roadbed, alleged that, in the performance of his duties as foreman, he was compelled to uncouple certain loaded cars, part of a train then in motion on defendant's railway, and while so doing was injured. Held that, it being *prima facie* negligence to go between cars of a moving train, such allegation, not stating any circumstances, either of special orders, general duty, or the necessities of the case, which required plaintiff to go between the cars, nor the rate of speed of the train, showed contributory negligence on his part, and rendered the petition bad.

2. SAME—NEGLIGENCE OF MASTERS—PLEADING.—The petition in an action against a railroad company for injuries to an employe resulting from a defect in defendant's roadbed, alleged to have been either a defect in original construction, or caused by washing, did not aver that defendant had a notice of the defect or that it had existed for such a time and under such circumstances that defendant could be charged with notice. Held that, considering the defect as caused by washing, the petition was bad for want of such averments, and an allegation that the defect had continued for an unreasonable length of time, being an averment of a conclusion, did not supply the omission.

THE NEBRASKA.

U. S. District Court, Illinois.

MARITIME LIENS—ORIGIN—STATUTORY LIENS. In this case the Nebraska had been sold by order of the court, and the distribution of the proceeds was the subject under dispute. In view of the Chicago Exposition, 1893, the owner had the vessel refitted and prepared for passenger traffic at a cost of $14,000. The amount realised by the sale was insufficient to pay all the claims in full, and the dry dock company which had done the repairs claimed a prior lien to the other creditors. Mr. Justice Grosscup, in giving judgment, said the statutes of Wisconsin, like those of Illinois, provided that the builder or repairer of water craft should have, under certain conditions, a lien upon such craft, and he thought there was no question but as between the owner and the dry dock company there exisfed the lien. But there were also claims by other parties for supplies furnished to the ship when navigating the lakes, and it was necessary to consider the law as to maritime liens. They were a creation of the law to make navigation possible, and arose at a time when craft of a nation in a foreign port had no credit except itself upon which to obtain the repairs or supplies necessary to take it home. The necessity of maintaining that credit inviolate caused the courts of the home port to enforce the pledge of the vessel, even to discriminating against other claimants, except salvors and seamen. It was upon the necessity of such cases that the doctrine of maritime liens proper grew up. Now in the present case the consideration of necessity did not exist in favor of the dry dock company. The owner could have had the repairs made at any port as well as at Milwaukee, and he chose that port, not in an emergency, but because it suited his purpose. There was, therefore, no maritime proper in existence. The claimants all contributed to the money earning capacity of the craft, and were necessary to put and keep the vessel afloat. His lordship could see no reason why those of the home port or the dry dock company should outrank each other. Under the statutes of Wisconsin, however, the company certainly had a lien, but the other claimants had liens under the Illinois statutes, and as these liens both arose from the same parentage, namely, the statutes of the respective states, his lordship held, following the decision in the Rumbell case, that, in the absence of any maritime reason for preferment, the liens must rank equally.

LAKE DRY DOCKS.

There are now at American lake ports twenty-three dry docks, all of which are of wood, the latest built being fitted with every modern requirement for the handling, docking and repairing of iron, steel, composite or wooden vessels.

It is the intention of the Union Dry Dock Co., of Buffalo, to enlarge one of their docks during the winter so as to give a draft of about seventeen feet over the miter sill. The Ship Owners' Dry Dock Co., of Cleveland, also intend making some further enlargements and improvements, and the firm of A. Gilmore & Sons, of Toledo, has just about completed enlarging their dock to the dimensions given in the following table.

At Canadian lake ports there are six dry docks though the A. & W. Muir's* plant at Port Dalhousie, Ont., is actually three docks in one, at least there is but one entrance to the graving docks laying side by side, having a length on keel blocks of 100 feet, 185 feet and 260 feet respectively, with a width at gate of 46 feet and carrying 10 feet 6 inches over the miter sill, so that this would actually make eight lines of keel blocks on the Canadian side of the lakes, one of which, operated by The Dry Dock & Wrecking Co., Limited, Collingwood, Ont., is entirely built of stone, the only one of that construction we believe on the lakes.

	Length Feet.	Gate Sill. Feet.	Miter Sill. Feet.
Miller Bros., Chicago, 3 docks	275 285 310	44 44 50	8 12 14
Ship Owners', Cleveland, 2 docks	300 340	52 50	14 16
Springwells, Detroit, 2 docks	220 360	42 66	10 10
Detroit Dry Dock, Detroit, 2 docks	245 375	48 78	8.3 16
Union Dry Dock, Buffalo, 2 docks	340 341	58 45	11 14
Mills' Dry Dock, Buffalo, 2 docks	280 370	41 46	11.6 12.6
Milwaukee Shipyard Co., Milwaukee, 2 docks	300 355	45 55	15 15.9
Cleveland Dry Dock Co., Cleveland; 1 ock	340	52	18
Dunford & Alverson, Port Huron, 1 dock	412	55	18
Bay City Dry Dock, Bay City, 1 dock	300	42.6	13.6
Wolverine Dry Dock Co., Port Huron, 1 dock	195	33	12
Chicago Ship Building Co., South Chicago, 1 dock	425	72	17
American Steel Barge Co., West Superior, 1 dock	487	52	15
A. Gilmore & Sons, Toledo, 1 dock	220	55	9.6
H. B. & G. B. Burger, Manitowoc, 1 dock	340	44	13.6
CANADIAN DRY DOCKS.			
Kingston Dry Dock, Kingston, 1 dock	280	55	16
A. & W. Muir, Port Dalhousie *	260	46	10.6
Toronto Dry Dock, Toronto	200	46	9.6
Pt. Robinson Dry Dock Co. Pt. Robinson	165	34	8
Owen Sound Dry Dock, Owen Sound	280	40	10
The Dry Dock & Wrecking Co., Collingwood	325	50	14*

From the foregoing particulars it would appear that exclusive of marine railways and minor facilities for sighting the bottoms of small tonnage the five lakes are fairly well supplied with dry docks, there being in all twenty-one firms engaged, or partially so, in this industry, and besides additions of equipment and enlargements of docks new enterprises are regularly spoken of as suitable for certain localities to facilitate repairs on vessels.

IRON MAKING.

Though there has been great progress in the methods of iron making in the past, the height of excellence has not been reached and the chemists are still experimenting upon methods to cheapen processes and to utilize the poorer grades of metal so that nothing shall go to waste. The London *Iron and Coal Trades Review* gave in a recent issue an interesting description of experiments with a new process for the elimination of sulphur from iron and steel by means of lime, a process which was highly successful and which turned poor iron into a product of very excellent quality.

The experiment was tried at Newport, Wales, and it consisted in bringing pulverized lime into direct contact with the molten metal by use of the direct force of the blast itself, just as the molten metal passes from the bottom of the coke bed to the hearth of the cupola furnace. Ordinary ground lime was fed into the tuyeres, and thus brought into touch with the metal to be acted upon in the most direct and scientific way. In speaking of an experiment with 500 pounds of cinder pig containing a large per cent. of sulphur, the *Review* says:

"Five hundredweight of cinder pig were charged into the furnace, with the usual proportion of coke, limestone, etc., and then commenced the process of loading the blast with lime in a powdered state. This went on continuously throughout the whole process, *i. e.*, ordinary ground lime being used. They continued blowing until the iron was melted down, which occupied about half an hour. At intervals during the experiment they watched the progress of the lime through the tuyeres, and found that it was freely and regularly injected into the furnace. There was no approach to gobbing up, and they could see distinctly the particles of lime, as carried in by the blast, impinging upon the molten iron as it trickled down in fine streams through the coke. The heat at the tuyeres remained at the normal degree, there being apparently no reduction of temperature due to the blowing in of the lime or any tendency to the formation of scaffolding, which it was thought might occur, owing to the infusible character of the lime. All the lime appeared to diffuse itself right through the furnace, and the characteristic lines of calcium, as given by spectral analysis, could be plainly seen in the flame at the top of the furnace. The iron was then run out and found to be of a very superior character. It was run into a ladle and cast into the usual molds. A sample of it on trial was found to be soft, tough and easily drilled by even a hand-drill, and the drillings came out something like those in common gray iron, and very unlike those producible in white cinder pig.

"The result of this test shows that comparatively worthless pig iron may be converted into a merchantable iron fit for best quality castings. In confirmation of this, it may be mentioned that the whole of the charge made in this experiment was used for castings required for some new hydraulic machinery for the Bute Dock Co., and, although they were not asked to give any report, the engineers engaged in that undertaking volunteered information to the proprietor of the the furnace that the castings were the best they ever remembered to have had."

THE PLANET MARS.

Mars was nearer the earth this month than at any time during its orbit, and the telescopes of every observatory in the country were leveled at the great red star. There have been some interesting discoveries, which go to prove almost conclusively that the planet is inhabited. The most important is that of the gemination or doubling of the famous canals. The great Italian astronomer, Giovanni Schiaparelli, many years ago said that the canals were in double lines, but his works being in Italian the fact was not generally known. M. Flammarion has translated some of his works into French, however, and renewed attention has been paid to to these canals, with the result that their being double has been proved beyond doubt. They can hardly be natural, for they ramify in all directions from the poles, the region of melting snow, and in a triangular manner that is evidently the result of design. They have been not alone proved to be double, but it has recently been noticed that wherever two canals meet there is a round, dark spot, evidently a junction. These junctions occur in every case where two canals intersect, and are presumably for the purpose of preventing the waters from overflowing the banks where they meet. They are much wider than the canals, and therefore give the opposing streams room to spread without overflowing.

The fanciful theory of the Martians signalling to the earth is completely destroyed. The points of light have been proved to be merely snow peaks illuminated by the sun. The waxing and waning of these lights, which has been put forward as an argument in favor of the signaling theory, is due to the accumulation and melting of the snow.

It is probable, almost certain, that the inhabitants of Mars do not know half as much about our planet as we know about theirs. Our globe is almost always half concealed by clouds and mists, while the atmosphere of Mars is always clear and cloudless.

The many careful observations of Mars during 1894, have undoubtedly been much stimulated by the widespread interest which has of late been manifested by the public in the various theories which have been started. The combined verdict of the astronomers in charge of the various observatories seems to be as follows:

The signaling theory is unalloyed bosh.

The canals, from their shape, direction and appearance generally go far to prove the habitation of Mars, and the recent demonstration of their being double helps the theory along.

Some observers claim that the dark patches which are visible at times are patches of vegetation, presumably forests. The theory is upheld by some and denounced by others, and the only theory in which all seem agreed is the canal theory.

If the canals really are artificial, as claimed, they represent an amount of labor which is well nigh inconceivable to us, even in these days of collossal engineering undertakings. They are many in number, many thousands of miles in length, and of a uniform width of 200 miles. To theorize upon the manner of men who can have carried out such work is to lose ourselves altogether in a sea of speculation.

THE MARINE RECORD

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CLEVELAND, O., NOVEMBER 22, 1894.

THE new Calumet elevator at South Chicago was opened on Monday by its first shipment of grain, a cargo of wheat being loaded on the Lehigh Valley liner Fred Mercur. The new elevator belongs to Bartlett, Frazier & Co., and has a capacity of 1,000,000 bushels. As we have previously observed this denotes the departure from Chicago proper at least a portion of its much maligned tonnage—both steam and sail.

BEGINNING December 1, 1894, the information signals displayed at stations on the Great Lakes will indicate the expected direction of the wind, whether easterly or westerly. The red pennant will be used to indicate easterly winds and the white pennant westerly winds. Orders to hoist these signals will specify the expected direction. Attention is called to the fact that the information signal when used at lake stations is not a notification that a storm is expected at other lake stations, but is a warning that winds dangerous to tows and small vessels may occur at the station displaying this signal

IN another column of this issue we publish particulars of the prominent dry docks of the Great Lakes which we have no doubt will be of interest to our readers as a record of dry docks. We may, however, point out that the Kingston dock on the Canadian side built about two years ago is by far the best dry dock on fresh water as regards construction. The above named dock was built under the auspices and is now operated by the Canadian government so that the question of finances may not be so clearly drawn as in the case of American dry docks, built solely by and in the interests of private owners.

A CORRESPONDENT in New York who is averse to the publicity of being quoted at large says, "I have not only appreciated THE MARINE RECORD during the past several years but I have shed its light abroad and I can assure you that THE RECORD has been read with great interest along the entire northern coast of South America and all through the Suez Canal and Red Sea, Africa, China and Japan. So you see that your excellent journal has carried marine tidings to the land of the Pharaohs, the celestial empire, the Latin countries and South America. This is the style of endorsement that we like to hear and more of our earnest patrons should give voice to their appreciation of THE RECORD.

INTERESTS have been for some time past centered in the Neosho and what the underwriters would do with her The latest advices to THE RECORD show that nearly every shipyard on the lake was represented at the sale of the steamer at Milwaukee on Monday afternoon. The wreck was purchased by C. H. Starke, representing the Milwaukee Shipyard Co., for $24,500. The main bidder against him, however, was Capt. C. W. Elphicke, of Chicago, who, it may be understood, is an underwriter of repute. The aggregate bills incurred in getting the Neosho off Spectacle Reef were about $20,000, so that the insurance companies which had $70,000 insurance on the steamer, have a balance of only $4,000 left, and this stands a most excellent chance of being cut down.

REPORT OF THE COMMISSIONER OF NAVIGATION.

One of the most inclusive and statistical reports of the present condition of the United States mercantile marine is contained in the forthcoming annual report of Hon. Eugene T. Chamberlain, United States Commissioner of Navigation.

From advance sheets of this annual epitome furnished THE MARINE RECORD, it is learned that on June 30, 1894, the documented merchant marine of the United States comprised 23,586 vessels of 4,684,029 gross tons, distributed geographically as follows: Atlantic and Gulf Coast, 17,468 vessels, 2,712,944 gross tons; Pacific Coast, 1,520 vessels, 456,359 gross tons; Northern Lakes, 3,341 vessels, 1,227,401 gross tons; Western Rivers, 1,257 vessels, 287,325 gross tons. Cod and mackerel fisheries employ 1,606 vessels, 71,573 tons, of which 32,493 tons are documented at Gloucester, Mass.

Vessels built and documented during the year numbered 838, of 131,195 gross tons, a decrease of 118 vessels and 80,000 gross tons, compared with the year ended June 30, 1893. Incomplete construction (St. Louis and St. Paul) at Philadelphia, has absorbed much labor and capital during the year, which will not be noted officially in construction until the vessels are finished. It is also noted that every shipbuilding country shows a decrease in construction last year, that of Great Britain amounting to 25 per cent.

American vessels registered for foreign trade number 1,350, of 916,180 gross tons, including 71 whalers, 16,482 tons, while those documented for domestic trade number 22,236, of 3,767,850 gross tons, 1,184 canal boats, 126,279 tons, and 1,417 barges, of 397,323 tons, are documented. Included in the merchant fleet are 811 iron or steel steam vessels of 878,333 gross tons and 5,715 wooden steam vessels of 1,311,097 gross tons; 20 sailing vessels of 22,988 tons are of iron or steel.

Since 1884 the number of American vessels has decreased 504, while the gross tonnage has increased 413,000 tons. The average size of vessels has increased from 177 tons in 1884 to 198 tons in 1894. Five ships and 123 steamers are over 2,500 tons each. In 1884 the steam tonnage, 5,401 vessels, of 1,465,909 gross tons, was one-third of our merchant marine, while in 1894 it comprises 6,526 vessels, of 2,189,430 gross tons or nearly one-half of the total. Considering the greater efficiency of steam tonnage, the carrying power, reckoned at 8,000,000 gross tons of 1884, may be put at 10,000,000 gross tons for 1894. In 1884 the iron and steel tonnage was less than nine per cent. of the total; this year it is twenty per cent. In 1884 the steel tonnage in our fleet was only 5,000 tons; in 1894 it is 350,000 tons. The construction of steel vessels in 1884 was carried on at only four points in the United States, while last year sixteen ports return such construction.

During the decade wooden sailing vessels have decreased 230,000 tons in Maine, and 100,000 tons each in Massachusetts and New York, while California and Michigan show a gain of 50,000 tons each.

The growth of the merchant marine of the Great Lakes is the feature of our maritime development, as we have steadily pointed out. The total tonnage of lake ports having increased 500,000 tons during the decade, or nearly doubled. Iron and steel steam tonnnage on the lakes has increased from 27,000 tons in 1885 to 260,000 tons in 1894. The iron and steel steam tonnage of New York State has increased from 145,000 tons in 1884 to 325,000 tons in 1894. The total tonnage of the Pacific Coast has increased thirty-five per cent. during the decade.

Vessels registered for foreign trade number 1,350 of 916,180 gross tons, compared with 2,127, of 1,304,221 gross tons in 1884, the decrease in sailing vessels being 835, of 469,944 tons, increase of steam vessels 58, of 81,903 gross tons. Of the increase 40,000 tons is due to the admission of foreign-built vessels, the New York and Paris constituting 21,000 tons of this amount.

And now as regards taxation in the past decade, Maine which imposes the highest taxes on shipping noted in any state or country, the tonnage registered for foreign trade has decreased two-thirds (223,000 tons), Massachusetts' three-fifths (120,000 tons), Pennsylvania's over one-third (28,000 tons), New York's one-seventh (60,000 tons), while California's has increased about one-sixth, (24,000 tons), and Washington's more than doubled (36,000 tons).

Iron and steel steamships registered for foreign trade number 108, of 228,575 gross tons, but of these only six last year crossed the Atlantic and seven the Pacific to Asia or Australia. Of the total 52, of 155,602 gross tons are registered at New York, which imposes no taxes on shipping in foreign trade, and 16, of 36,630 tons at San Francisco. Philadelphia registers for foreign trade 8 iron steamships of 8,482 tons, Boston 3 of 2,026 tons, New Orleans 16, of 36,630 tons, Tampa, 2, of 3,385 tons, Seattle and Tacoma 4, of 2,875 gross tons.

States with the greatest tonnage of all descriptions are New York, 1,333,665 gross tons, Michigan 436,317, Massachusetts, 366,881, Maine, 327,653, Ohio 327,589, California, 315,516, Pennsylvania, 302,615, Maryland 145,128.

The twelve customs districts with the largest tonnage of all descriptions are New York, 1,057,788 gross tons, San Francisco 307,226, Cuyahoga (Cleveland, O.) 234,734, Philadelphia 221,648, Boston 214,916, Buffalo, N. Y., 177,992, Huron, Mich., 171,629, Detroit 161,846, Bath, Me., 124,649, Baltimore, 122,872, St. Louis 122,746, Milwaukee 93,767. Of a steam tonnage of 2,189,430 gross tons of all descriptions, 482,294 tons are documented at New York. 183,224 at Cuyahoga (Cleveland), 128,839 at Buffalo. 128,386 at San Francisco, and 120,817 at Detroit. Documented yachts number 1,054, of 39,216 gross tons.

It is estimated that to man all our vessels registered for foreign trade would require about 22,000 men, and that last year the number actually employed in our foreign trade was about 12,000. The shipping of seamen before United States shipping commissioners numbered 71,500. That number, covering in many instances repeated signing of articles by the same men on different voyages during the year, is estimated to represent about 18,000 men.

Classed by nativity the shipments were 22,143 Americans, 21,966 Scandinavians, 10,346 British, 6,247 Germans, 628 French, 865 Italians, and 9,042 of other nationalities. The shipments at New York numbered 15,002, San Francisco 13,315, Philadelphia, 8,851, Boston 7,756. The United States consul at Southampton reports 8,535 shipments at that port, 7,767 of these being British for the New York and Paris.

AN ADMIRAL'S OPINION.

In a paper read last week before the Society of Naval Architects and Marine Engineers, at New York, Rear Admiral Meade criticises severely the Columbia and Minneapolis and cruisers of the Detroit class that have recently been added to our navy. This criticism has caused a great deal of comment in naval circles. It is claimed that Admiral Mead's strictures are unfair, and that per ton our ships built within the past decade compare favorably with those of the foremost naval powers.

Admiral Mead's proposition to race the best of our war ships with the fastest of the ocean liners, seems fair enough on the face of it and without doubt it would be a fair test of the continuous speed of our best war ships as compared with the fastest of the merchant marine. But here comes in the difficulty. While our fastest cruisers may be able for a specified distance to outstrip any ocean liner as yet built, they are wanting in the coal storing or bunkering capacity essential for a long ocean race.

The younger naval officers are eager to prove that Admiral Meade's criticism is unjust by having an actual speed test made between our swiftest war ship and such a vessel as the Majestic, between New York and Queenstown. As our swift cruisers are intended to be "commerce destroyers," such a race would be well worth the money it would cost. The Columbia and the Minneapolis, naval experts, are sure can maintain between here and the Irish coast an average speed of 22 knots an hour. To make the trip at this speed would require about 4,000 tons of coal, but neither of the vessels has that bunker storage so far as we can learn. They could carry coal on deck in an emergency, but perhaps they were intended for a dash of 24 to 48 hours.

Admiral Meade's contention is that if the speed of the merchantman be as great as that of the swiftest cruiser, and its coal service greater, it will be more serviceable in case of trouble than the ship built expressly for cruising. This may be true, but it should be remembered that the merchantman, unlike our cruiser, is not built with an eye to offense or defense, and to render her such would take money and more valuable time. In war the fighting power of a ship is everything, and if this be added to speed the merchantman is powerless.

"Nauticus," recognized as the best naval authority in England, does not seem to take Admiral Meade's view of our navy. In a paper in a recent number of the *Fortnightly Review* this expert claims that weight for weight our recent ships are greatly superior to the English. He compares our ship the New York with the British Ad-

miral Blake, and shows that the former, though inferior in tonnage, is in speed and as a fighting machine vastly superior to the Blake. In the same way this writer compares our war ship Indiana with the English ship Renown, and demonstrates that while the latter, considering weight and cost, should be superior, she really is inferior, and that in a contest with equal management the American would win.

Admiral Meade's criticism has caused much feeling, but his ability is undoubted and the discussion must result to the advantage of our naval and mercantile marine.

A CHICAGO OBSTRUCTION.

We have learned this week that the superstructure of the two and one-half mile crib off Twelfth street has been torn down by the contractors and the crib below the water still remains intact. As there is no light on the crib at night nor a buoy in the daytime, the crib presents a dangerous obstruction to navigation fully as bad as the Hyde Park reefs and more dangerous than the reefs because its location is not known. The crib lies about two and one-half miles from the shore off Twelfth street and a mile and one-half west of the four mile crib, which has a light. Wonder why the Lighthouse Board can't take cognizance of some of these things.

AT the launch of the St. Louis, at Cramps' yard in Philadelphia, Mrs. Cleveland, wife of the President, as is customary on such occasions as the naming of a ship, broke a bottle of wine on the bows. It was American champaign, and if the custom is to be kept up, and we certainly cling to worse ones, it is better that American wine should be used than the foreign element. Yet, the Woman's Christian Temperance Union is up in arms at "the barbarous use of wine" under the circumstances named, and they aver that Mrs. Cleveland could have named the vessel without this part of the ceremony. The W. C. T. U. is an excellent organization, but we much fear it is expending its energy in this matter, where it cannot get the sympathy that goes out to many of its other efforts. The loss of the wine is not complained of; it is the custom, but custom is the basis of all our common law. It is the lex non scripta of this country. But even from a temperance standpoint, is it not better to spill it than to drink it? And furthermore, the ladies are going entirely out of their latitude to object to the christening ceremony over the production of which they are not known.

THERE is evidently something to be found out relative to the tonnage that lays up at Chicago for winter storage of wheat. The following circular has been sent out by general agents of insurance companies. An invitation to insurance agents to meet at Detroit, Nov. 26 to consider the inspection of vessels which are to take on grain for winter storage has been sent out by Chicago agents. They say that every winter much grain is damaged by being stored in vessels on account of the boats being out on commission. They would remedy this by requiring a certificate from the underwriters' inspector that they are fit to receive grain before being allowed to load. The lines of insurance are being drawn tighter and we will soon learn that vessel owners will protect themselves by entering into a mutual marine insurance system whereby some of the most expensive traits of carrying on a general office will be avoided.

THE LAKE ERIE BOILER WORKS.

To make pretensions of excellence is one thing, to gain and maintain a reputation through a series of years for the manufacture of a high-classed specialty is another. The Lake Erie Boiler Works, Messrs. Hammond and Coon, principals, have succeeded in winning renown from end to end of this continent and are still improving on their standard of merit in the construction of marine and stationary boilers.

The trite old saying, "In time of peace prepare for war," has been appreciated by the Lake Erie Boiler Works and during the slack times they have been making very extensive improvements in their already unsurpassed facilities for the manufacture of modern marine boilers.

The additional new machinery fitted at these works consists of a heavy flanging press, capable of flanging plates up to 2 inches in thickness, with heating and annealing furnaces, two of Hammond's improved three spindle drilling machines for drilling the boiler shells and other parts, after the plates are formed in place, two of Hammond's improved universal joint radial drills, two 50-ton hydraulic cranes, 40 feet lift, two 10-ton hydraulic jib cranes, and one of Hammond's improved portable hydraulic riveters for pressing rivets up to 2 inches diameter at 250 tons' pressure. This machine can be easily handled by one man. In addition to the above large machines, they have placed a variety of smaller machines, such as portable drilling and tapping machines, mechanical caulking and beading tools, etc.

The capacity of the works has been further increased by the addition of an erecting shop 150x65 feet, so that they are now better than ever prepared to handle the heaviest boiler work that may be required, for lake or ocean service.

The Lake Erie Boiler Works were the first in America to build large marine boilers with hydraulic machinery for riveting, flanging, hoisting and handling, as they were also the first to drill the rivet and brace holes after the plates were formed in place, by multiple spindle hydraulic drilling machinery; the boilers being suspended from hydraulic cranes for this purpose. There are four of these machines now in use. Each machine is capable of drilling three holes at one time 1½ inches diameter, or two holes 2 inches diameter, or one hole 2½ inches diameter. The hydraulic cranes for suspending the boilers over these machines, while the holes are being drilled are each capable of lifting 50 tons.

Among the more notable steam vessels equipped with the Lake Erie Boiler Works boilers are the following:

NAME OF STEAMER.	Type	No.	Diameter	Length.	W. P. Pounds.
Susquehanna, Anchor Line, Buffalo	Sin. end Scotch	4	13 ft.	11 ft	120
Car Ferry and Ice Breaker, St Ignace	Dbl end Scotch	3	11 f.. 6 in.	18 "	160
Steamer Harlem, E & W. T. Co. Buffalo	Sin. end Scotch.	2	11 " 6 "	18 "	160
City of Detroit, Detroit, Mich	Scotch.	4	12 "	11 " 6 in.	125
Chemung, Buffalo, N Y	"	6	11 " 8 "	12 "	165
Owego, Buffalo, N. Y.	"	6	11 " 8 "	12 "	165
George Jay Gould, Buffalo, N. Y	"	2	11 " 8 "	12 "	165
Brazil, Buffalo, N. Y.	"	2	11 " 8 "	12 "	165
Codorus, Anchor Line, Buffalo	"	2	14 "	12 "	165
Thomas Maythem, Buffalo, N. Y.	"	2	12 "	12 "	165
Arthur Orr, Buffalo, N. Y.	"	2	12 "	12 "	165
Side-wheel Str. Plymouth, Fall River Line N. Y	"	8	11 " 8 "	13 "	175
Side-wheel Str. Michigan, Chicago, Ill.	"	4	13 "	14 "	100
Newport News Shipbuilding & D. D. Co., Newport News, Va.	"	2	9 " 6 "	10 " 6 "	185
N. N. S. B. & D. D. Co., Newport News, Va	"	2	11 "	12 " 9 "	160
Str. Concho, N. T. & Texas S. S. Co., New York	"	6	13 "	11 " 6 "	165
Str. Algiers, Morgan Line, N. Y	"	1	14 " 3 "	12 " 6 "	165
New York, Morgan Line, N. Y.	"	1	14 " 3 "	12 " 6 "	165
D. R. I. S. B. & Engine Works, Chester, Pa.	"	8	14 "	12 " 8 "	180
Two Steamers for Old Dominion Steamship Co.	"	....	.....	.....	.....
Manhattan Ry. Co., New York	"	2	9 "	9 6	125
Yacht Kanapaha, J. Pierpont Morgan, New York	"	2	11 "	10 6	.....
Rio Grande, N. Y. & Texas S. S. Co., New York	"	4	12 "	10 9	120
Str. Morgan, Sonthern Pacific Co., New Orleans, La.	"	1	9 "	18	65
Str. Gussie, Southern Pacific Co., New Orleans, L	"	1	11 "	21	65
Pizzatti, New Orleans, La	"	2	10 " 6 "	16 6	65
Monarch, N. W. Transportation Co., Sarnia, Ont.	"	2	13 " 2 "	11 3	170
U. S. S. Michigan, U. S. Navy	"	2	9 "	15 3	.....
Bancroft	Gunb't	2	8 " 8 "	17	160

Hundreds of other boilers have of course been built and they have furnished boilers for nearly all the great whaleback steamers built by the American Steel Barge Co., Superior, Wis. Among these built but not owned by the Steel Barge Co. are the following steamers, Pathfinder, Pillsbury and Washburne, each furnished with three Scotch boilers, 11 feet 8 inches diameter, 13 feet long, for a working pressure of 165 pounds.

The Lake Erie Boiler Works very pertinently assert that they are in the lead in building large Marine boilers, and intend to keep it, and claim to have the best equipped plant in America, thus being in a position to give their customers the benefit of valuable experience and high-class equipment.

STAGE OF WATER AT ST. MARY'S FALLS CANAL.

DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

Depth of water at the St. Mary's Falls Canal for the week ending Nov. 22, 1894:

Nov.	15	8 a. m.,	14	feet	10	inches.	8 p. m.,	14	feet	9	inches
"	16	"	14	"	9	"	"	14	"	9	"
"	17	"	14	"	5	"	"	14	"	6	"
"	18	"	14	"	9	"	"	15	"	1	"
"	19	"	14	"	6	"	"	14	"	8	"
"	20	"	14	"	4	"	"	14	"	7	"
"	21	"	14	"	8	"	"	14	"	7	"
"	22	"	14	"	7	"	"				

ANNUAL MEETING OF U. S. NAVAL ARCHITECTS AND MARINE ENGINEERS.

The second annual meeting of the Society of Naval Architects and Marine Engineers began at the rooms of the society in New York on Thursday last. The hall was well filled with well known engineers and naval officers. Among those in attendance were William H. Webb, William H. Jaques, Harrington Putnam, Francis Tiffany Bowles, Frank L. Fernold, U. S. N., Clement A. Griscom, Jos. Feester, U. S. N., Edward A. Steven, Wm. J. Baxter, U. S. N., Edwin S., Wm. M., and Charles H. Cramp, Frank L. De Braque, Wm. Frederick Durant, Andrew and Wm. H. Fletcher, Wm. Gardiner, John S. Hanscon, H. S. Heyward, Philip Hichborn, Jno. D. Hoover, U. S. N., Charles E. Hyde, Jos. H. Leonard, Walter M. McFarland, U. S. N., Charles H. Manning, George W. Melville, Wm. McIntyre, U. S. N., Lewis Nixon, John F. Pankhurst, Horace See, A. W. Stahl, Sinclair Stuart, Wm. H. C. Swenson, John G. Tawnsey, Saphen Taylor, Andrew Gray Wilson, Frank E. and F. A. Kirby, Gilbert N. McMillen and C. B. Calder.

The officers who served last year were all re-elected and president Clement A. Griscom, after taking the chair, made a short speech, in which he thanked the members for the confidence that they had placed in him, and pointed out to them that it was the obvious duty of the society to create a public interest in a large navy and merchant marine for this country.

He then introduced Rear-Admiral Mead, who read a paper entitled: "Some Suggestions of Professional Experience in Connection with the Naval Construction of the Last Ten Years." Admiral Mead stated at the outset that though he had suggestions to make in regard to the navy he had no intention of picking flaws or to seriously find fault with recent naval construction. He then spoke of the great necessity of arousing public interest in the navy and told of the opposition there had been to the first steel ship in the United States Navy. That ship was the Dolphin, and the Admiral remarked that in 1883 many naval officers had objected to steel ships, saying that wooden ships and smooth-bore guns were preferable.

"It is hardly possible in 1894 to convey an idea of the intense prejudice on the part of a majority of our navy men (seamen and constructors) in favor of wood as against iron. So powerful was this 'conservatism' that not until 1883 could anything be done in the way of progress.

"In that year there fortunately came a 'boom' in naval matters, and in due course of time the Dolphin, Atlanta, Chicago and Boston appeared as the pioneer ships of the 'New Navy.' But the innovation was strenuously resisted, and so late as 1886 I heard conservative men arguing in favor of wooden ships and smooth-bore cannon.

"The vessels that seem least satisfactory to the practical men of our profession," said he, "are the Columbia, the Minneapolis and Detroit class. And they are unsatisfactory for these reasons: The smaller vessels cannot cruise in time of war except in home waters, and as to the larger ones, such as the Columbia, it is feared that vessels like the Majestic and Teutonic, for instance, may laugh at our three-screw racers, which cannot cross the ocean at the same speed these commercial greyhounds maintain year in and year out."

The Admiral also said that he very much doubted if the fighting qualities of the Columbia would equal those of the Atlantic line merchant steamers, New York or Paris were the later suitably armed and manned. He strongly recommended the building of rams and torpedo boats and armored battleships. Fast cruisers, in his opinion, were practically useless, as they would be bested by ocean steamers in time of war.

Mr. E. A. Bertin read a paper on "The Use of Small Models for the Determination of Curves of Stability." He gave a general description of the method and also recounted the historicsl development of the subject.

A paper setting forth the "Obstacles to Ship Building and Owning in This Country" was then read by Mr. George W. Dickie. He said that the lack of interest in naval matters displayed by the people and the men high in office was the thing which had done a great deal to keep the United States from becoming a stronger maritime nation. He told how in England launching of battle ships and naval manoeuvres are made public functions, and how the youth in the British school is taught to regard England's naval supremacy as the

stronghold of the nation. He recommended legislation and the spending of public moneys for the purpose of improving and fostering the American shipping interests.

Mr. E. M. Cheneau, associate member, read a paper on "Cellulose and its Application to War Ships," in which he told of a special kind of cellulose, extracted from the husks of cocoanut, having some remarkable properties, which would make it very valuable for the purpose of insuring the "unsinkability" of ships. "The amorphous cellulose," as the inventor named it, is extremely light, its specific gravity being only one-fourth that of a cork. When compressed to a certain degree it is highly elastic and swells rapidly when it comes in contact with water. Its composition is such that it cannot rot or decay and is not liable to be attacked by insects." Mr. Cheneau said that Admiral de la Barriere of the French navy, who is the discoverer of this particular kind of cellulose, holds that a ship fitted with this substance even though pierced by a ram would keep afloat. The only thing that could sink her would be torpedoes.

Mr. Cheneau then told of several remarkable devices to prevent the in-rush of water through holes in a ship's side, but he strongly recommended a cellulose mattress, which has been devised, and which, by means of ropes and weights, can be applied from the outside of the ship and stop the leak until the hole can be reached from the inside and the leak stoppers put in place.

Chief Engineer George W. Melville, of the United States Navy, read a paper on "The United States Triple Screw Cruisers Columbia and Minneapolis."

He first talked of the efficiency of the triple screw. Among other proofs that the system was superior and more economical than the twin screw system, he cited the following :

"The French experiments on the Carpe, and the trials of the Tripoli had demonstrated that there was no doubt of the practical success of triple screws, and the preliminary design of the Dupuy de Lome, with triple screws, showed that the French were satisfied with the Carpe experiments. I believe, also, that we would find it more economical to run one engine of a size for 7,000 indicated horse power at about 2,000, than to run two 10,500 indicated horse power engines, or even two 5,000 indicated horse power engines, even if it did involve dragging the idle screws, allowed to revolve freely."

After this Mr. Melville gave figures showing that the gain in speed for a triple screw of the same power as a twin screw ship was very large. He pointed out the twenty-three knots of the Columbia and Minneapolis as compared with the twenty-one of the New York and Olymyia. "When such a gain as this is shown," he continued, "the most natural thing is to search for the cause, and here we are met with obstacles at the very start. Probably after some consideration the first suggestion would be that the center screw is very favorably placed for securing whatever benefit there may be from working in the forward current of the frictional wake.

"This would doubtless be accepted but for the fact that most of the authorities on screw propulsion have stated that while the screw itself would be helped any gain in this direction would be offset by the increased resistance of the vessel due to the action of the screw interfering with the steam line action.

"It should be said, however, that most of the authorities simply state this as a proposition, without attempting any demonstration or quoting experimental data to confirm the statement. I am inclined to believe that this statement is hardly necessary to remind this society that, while the experiments themselves were admirable in every way, the Greyhound had a very poor model compared with modern steamships, and her machinery was also much different from that we now use.

"As a result the data of the Greyhound experiments are of very little use as a guide for modern hulls and machinery. For example, Froude gave as a result of his experimeats that the effective horse power or power actually applied to overcome the resistance of the hull was only from 37 to 40 per cent of the indicated horse power of the engines.

"About ten years or so ago the late Mr. William Denny quoted a case where a comparison of the indicated horse power with the effective horse power as determined by model experiments made by the younger Froude had shown the ratio to have risen to 60 per cent, and some calculations that I have had made for some of our new ships has shown the ration to be in some cases nearly 75 per cent. I feel, therefore, that we should not let our admiration for Mr. Froude's great reputation lead to the unqualified acceptance of statements based on his experiments on the Greyhound."

Mr. S. Dana Greene read a most interesting paper on "Electricity on Shipboard."

On the second and concluding day's session of the convention, the first paper read was by Prof. C. H. Peabody and assistant Prof. E. F. Miller, of the Massachusetts Institute of Technology, Boston, on "A Dynamic Steam Engine Indicator Tester." It was a highly technical description of a machine for testing steam engine indicators by direct comparison with mercury columns, which for nearly a year had been in use at the institute. It was apparently extremely interesting to its hearers, although little discussion was ventured upon.

The second paper was read by Philip Hichborn, chief constructor of the United States Navy, setting forth the "experience gained with our new steel ships as regards care and preservation."

"There is a popular and not unnatural impression," he said, "that a new ship, like a new garment, will go a long time without repairs. I need hardly point out to the members of this society that, as a matter of fact, in the case of a new man-of-war, the interval before repairs of some kind will be needed is exceedingly short. I think that this would be clear to the popular mind, also, when the qualities and functions of a modern man-of-war are considered. Take, for instance, a battleship of the type of the Indiana, Massachusetts and Oregon. She is the home of about 500 men, and must furnish them accommodations for eating, sleeping and living. She carries propelling machinery capable of driving her at any time at a rate of over 15 knots speed per hour, with 400 tons of coal at normal fighting displacement, though she can carry 1,600 tons if necessary. She carries 44 guns, varying from from the 13-inch with its projectile of 1,150 pounds, to the 6 mm. Gatling, which fires a bullet of .0186 pound. Ammunition for all these guns is carried in quantities sufficient to enable her to fight a prolonged action and still have some left. The heavy guns and their crews, the propelling machinery, the principal auxiliary machinery and the buoyancy and stability of the ship are protected by armor varying from 18 inches to 4 inches in thickness. The structure of the ship must be absolutely seaworthy, must support all the above weights without being unduly strained, and must, moreover, be minutely sub divided into small compartments. Fresh air must be supplied all over the ship, and foul air removed. Water found in any compartment must be pumped out. All of the above qualities are possessed by a structure some 350 feet long, 69 feet wide, and 43 feet deep, displacing normally 10,200 tons of sea water, whose cubic contents are the same as those of a cube whose edge is 85.7 feet.

"It is evident that the wear and tear upon a structure such as this, while in commission, must go on at a rapid rate, and it is only by constant attention and by the 'stitch in time' that 'saves nine' that it can be kept in a condition of thorough efficiency and ready for active service.

"A large part of the duty of the Bureau of Construction and Repair consists in making good the effects of wear and tear, accidental damage, etc. * * * Apart from accidental damage the deterioration of the steel structure is always due to oxidation or rusting, and the only way to prevent it is to keep the surface of the metal properly covered by anti-corrosive material. This would seem at first sight a comparatively simple matter, but in actual practice, with the utmost care, it is found impossible to avoid a certain amount of corrosion."

Mr. Hichborn considered fouling of vessels' bottoms a matter for very great anxiety, because "intimately connected with the fighting efficiency of our ships."

"A few facts will help to emphasize this most important point," he said. "A recent instance is that of the Bennington. In making the run from Acapulco to La Libertad, May 17-21, 1894, with a clean bottom, this ship traversed 675 miles in 86 hours, with a coal expenditure of 67 tons. Two months later, July 25-30, she returned over the same course, traversing 688 miles in 111 hours, and consuming 129 tons of coal, or almost exactly double the quantity used when the bottom was clean. The cost of coal for this passage was $1,453.90 going south, and returning was $2,799.30, an additional cost for this short time of $1,345.40, due solely to fouling of the bottom in two months' time, besides taking 25 hours longer to make the passage."

In order to prevent fouling Mr. Hichborn advocated sheathing with wood and copper the bottoms of all the ships intended for distant service, and glanced at the extent to which this prevention had already been adopted by the admiralties of England, France and Russia—especially the first named.

Capt. W. T. Sampson, U. S. N. Chief of the Bureau of Ordinance, was on the program to read a paper on the present status of face-hardened armor. Owing to the illness of Capt. Sampson, the paper was read by Secretary Capps. The apparent difficulties, he said, which at first delayed the development of face-hardened armor in this country, and which had been by some regarded as insuperable, had either disappeared upon closer inspection or been practically overcome. He continued:

"The greatest objection to the face-hardening or Harvey process, and one which seems least likely to be overcome in the immediate future, is its expense. The thickest plates are exposed to high temperatures for weeks at a time, and the charges for repairs, fuel and labor are very great. It seems, possible, however, that means may yet be determined for shortening this stage of the process and reducing somewhat the temperature required for cementation. The repeated machining, however, can hardly be dispensed with; shrinkage and distortion occur, not only in the hardening, but in the cementation as well. Plates must be at least approximately machined before cementation; they must then be shaped and machined to such dimensions as experience has taught will, after hardening, be satisfactory. Even then it may be necessary to anneal, machine and retemper, before obtaining satisfactory results. These difficulties of the manufacturer, although reduced by skill and experience to the minimum, are likely to remain permanent.

"Whatever conclusion is reached, the fact remains that Harveying in its present state has increased the resistance of armor fully 35 per cent. and perhaps 50 per cent. according to the thickness of the plate. It has also brought about a great improvement in the quality of our projectiles, and in doing so has perhaps lost some of the advantage it held over them at first, when subjected to direct impact. Its superiority, under inclined impact is nearly as great as it ever was, and it does not seem possible that in this respect the relation between gun and armor will for a long time to come take the old position held in the time of soft armor. Perhaps this relation may be restored, however, should the thickness of armor be reduced to a point allowing no more than the old resistance, in order to distribute it over a larger area or divert the weight thus saved to other uses."

A paper on "Hydraulic Power for War Ships," was next read. It was an elaborate plea for the use of hydraulic power instead of steam or compressed air in actuating in war ships all the auxiliary machinery not directly connected with the running of the main engines

At the second annual dinner of the Society, Clement A. Griscom presided, and on his left sat assistant secretary of the navy, William McAdoo, while on his right was ex-secretary of the navy, Benjamin F. Tracy.

The first toast was "The United States," to which there was no response. The second was the United States Navy," which was responded to by assistant secretary of the navy, William McAdoo.

The next speaker was ex-secretary of the navy, Benjamin F. Tracy. He said in part: "I am here simply to testify to my interest in this young, prosperous and most useful society. Whatever may be the future greatness of our merchant marine, it will owe its success to the people who have put their shoulder to the wheel to rebuild the navy. It is by the rehabiliment of the navy that we secure the means of building up our merchant marine.

"It is owing to the rebuilding of the navy that we now have the greatest and best shipyards on the globe. But it is idle for us to ask or expect private enterprise and capital to compete with foreign nations who are subsidizing their merchant marine.

"The time is not far distant when our merchant ships shall be the rivals of any nations and that our flag shall be seen on every sea, I have no doubt. The St. Louis is only the forerunner of many other vessels which will follow until our merchant marine is honored and respected by the nations of the world. Then, too, we need these vessels as auxiliaries to our navy.

"The slight increase in the cost resulting from building our own ships should not keep us from building them. In a few years I believe we will be able to produce ships as cheap as any nation. In fact, we do now, when the material with which we are building them is compared with that put into them by nations across the water.

"I have often said that the central seat of the future empire is the sea. No nation can threaten us on our own land, but if we would achieve the greatness that belongs to us we must regain our position on the sea.

"It has been said that we are, to some extent, the guardians of the republics of South America—that interest we feel in them; the confidence they have in us should be one of the chief reasons for establishing commerce with them. But, remember, we cannot expect private capital to do it."

The other speakers were Admiral Meade, George W. Melville, Andrew Fletcher, E. A. Stevens and H. Putnam.

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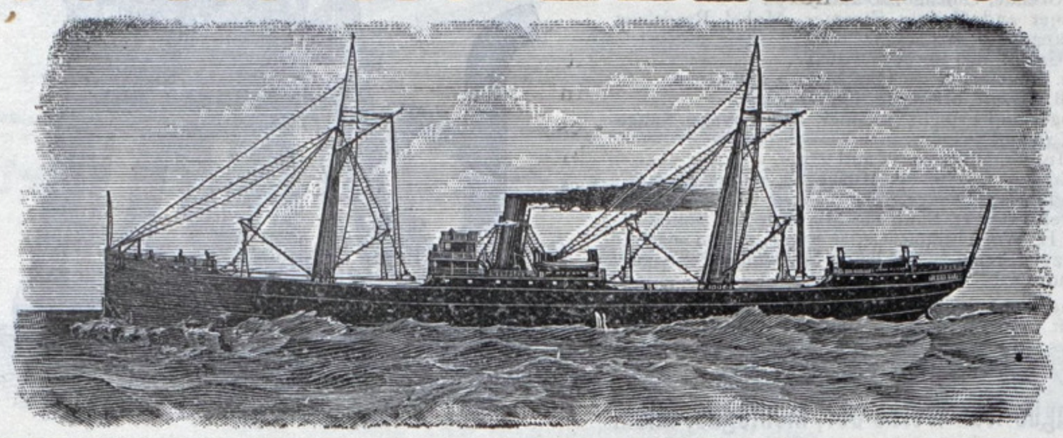

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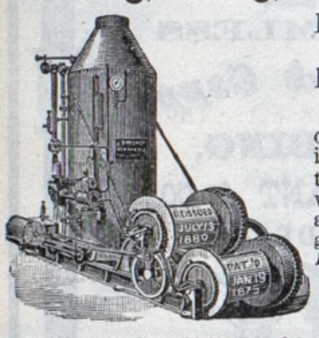

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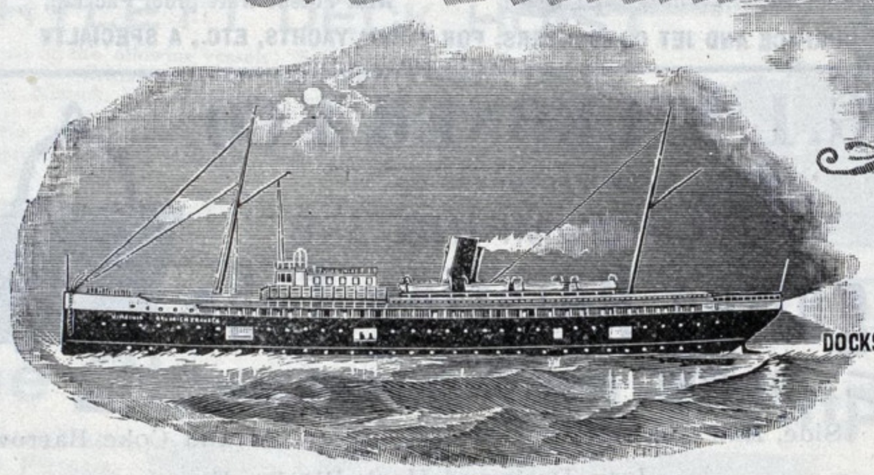

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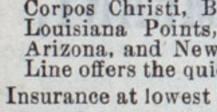

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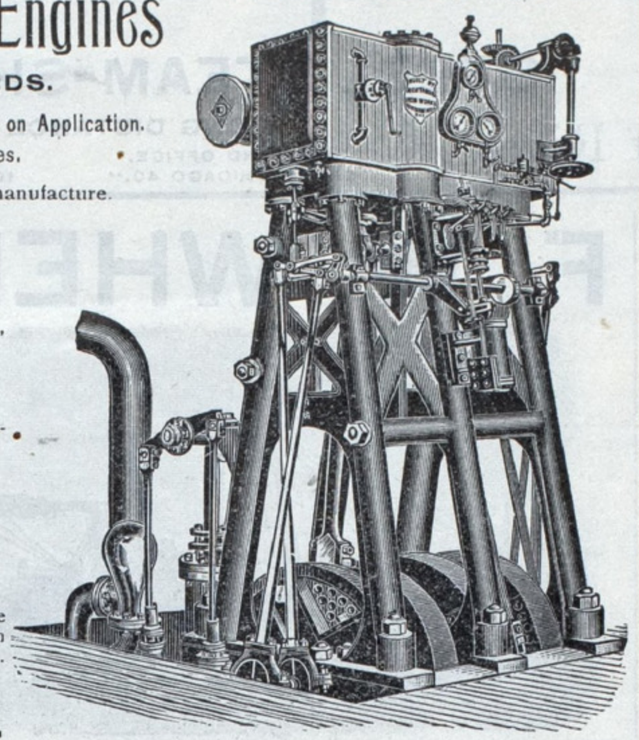

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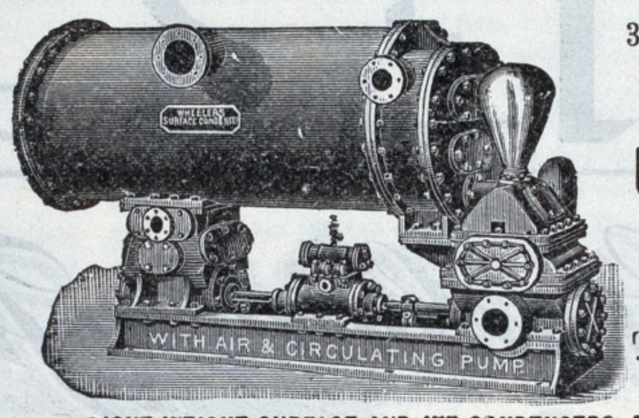

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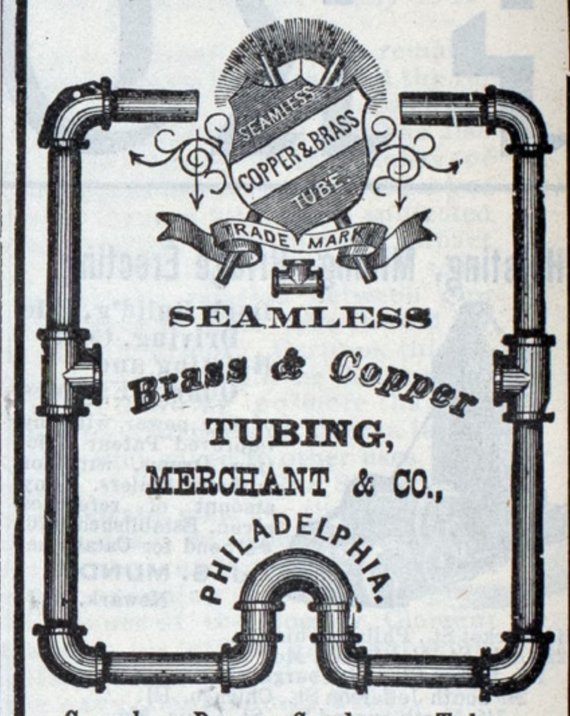

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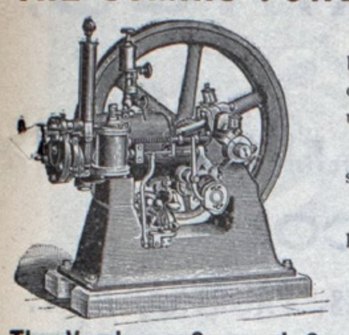

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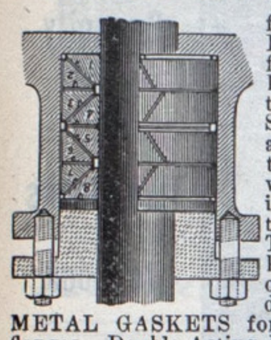

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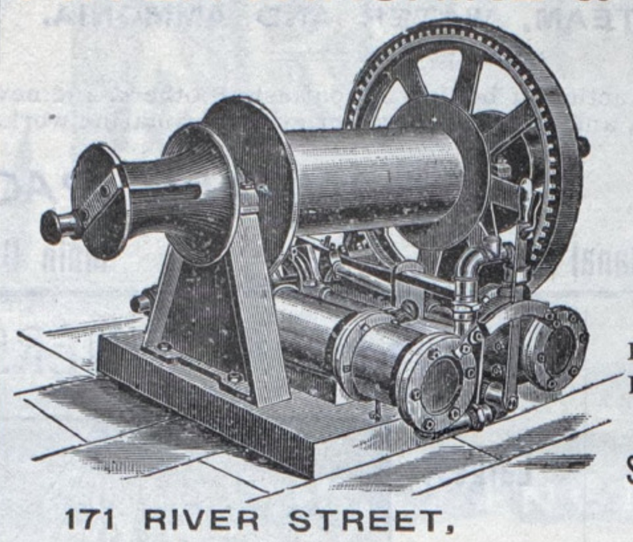

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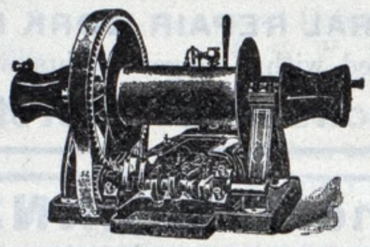

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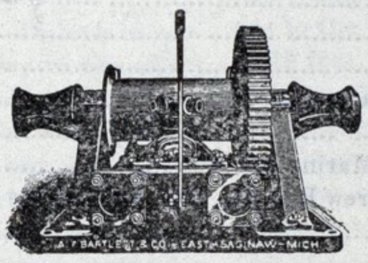

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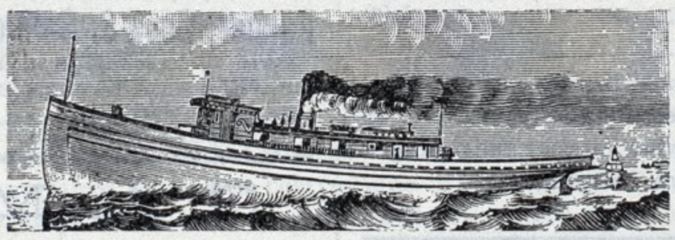

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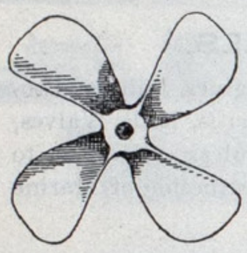

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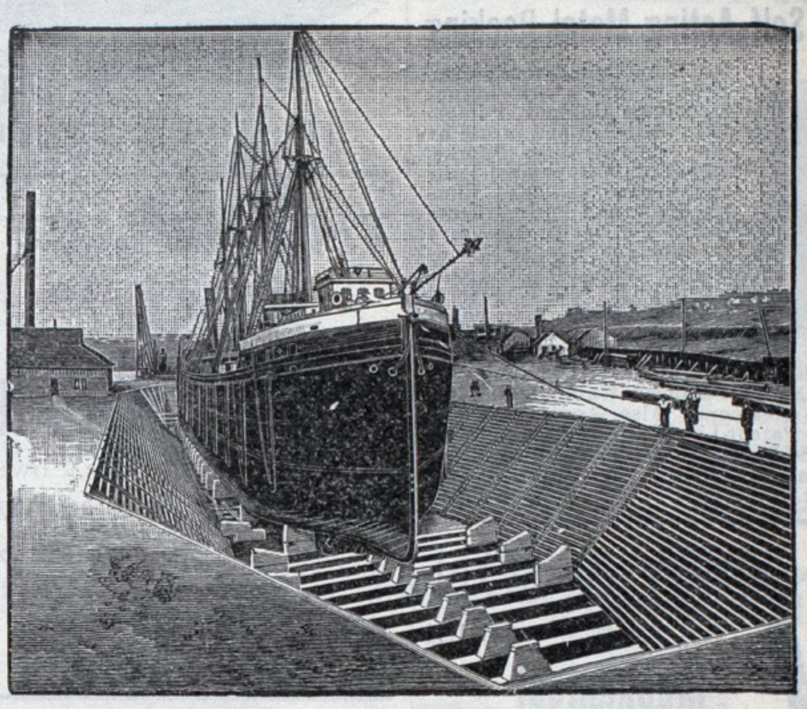

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